CLAIMS

1. A scent- and multimedia-bearing card for use with a separate scent release and multimedia playback system, the scent- and multimedia-bearing card comprising:

a scent storage medium for storing at least one scent;

an encapsulated multimedia storage medium for storing multimedia information; and

scent release and multimedia playback control information for use by the scent release and multimedia playback system in coordinating scent release and multimedia playback from the scent- and multimedia-bearing card.

2. The scent- and multimedia-bearing card of claim 1 wherein the encapsulated multimedia storage medium comprises a Type II DVD-RAM-like cassette device, the Type II DVD-RAM-like cassette device having a housing structure encapsulating a removable DVD-RAM or DVD disc.

3. The scent- and multimedia-bearing card of claim 1 wherein the scent storage medium stores a plurality of scents.

4. The scent- and multimedia-bearing card of claim 1 wherein the scent storage medium stores at least one fragrance.

5. The scent- and multimedia-bearing card of claim 1 wherein the scent storage medium stores at least one aroma.

6. The scent- and multimedia-bearing card of claim 1 wherein the scent storage medium stores at least one flavor.

7. The scent- and multimedia-bearing card of claim 1 wherein the scent storage medium stores at least one air-borne therapeutic agent.

8. The scent- and multimedia-bearing card of claim 1 wherein the scent storage medium stores at least one air-borne medicine.

9. The scent- and multimedia-bearing card of claim 1 wherein the scent storage medium comprises:

a housing;

a scent storage reservoir contained in the housing; and

a scent release unit connected to the scent storage reservoir for releasing scent from the scent- and multimedia-bearing card.

10. The scent- and multimedia-bearing card of claim 9 wherein the scent release unit comprises:

a scent release chamber for containing scent just prior to release; and

a tube connecting the scent reservoir to the scent chamber.

11. The scent- and multimedia-bearing card of claim 10 wherein the scent release chamber comprises a three-dimensional region enclosed on all sides except having a scent release opening facing upwards for releasing scent from the scent release chamber, and wherein the scent release unit further comprises:

a cover for covering the scent release opening, wherein the cover is moveable between at least two positions, a first position wherein the scent release opening is substantially sealed thereby preventing scent from escaping from the scent release chamber, and a second position, wherein the cover is displaced from the opening in the

scent release chamber, wherein the displacement of the cover permits scent to escape from the scent release chamber during scent release operations.

12. The scent- and multimedia-bearing card of claim11 wherein the cover is made from electromagnetic material and wherein the scent release unit further comprises:

an electromagnet for moving the cover from the first position to the second position; and

electromagnet control means for controlling the operation of the electromagnet.

13. The scent- and multimedia-bearing card of claim 12 wherein the electromagnet control means further comprises:

wiring for receiving control signals from the scent release and multimedia playback system, the control signals controlling the operation of the electromagnet.

14. The scent- and multimedia-bearing card of claim 12 further comprising:

a spring connecting the cover to the scent release unit, wherein the spring maintains the cover in the first, closed position until the electromagnet is energized, when the cover moves to the open, second position, and wherein the spring returns the cover to the closed position after the electromagnet is de-energized.

15. The scent- and multimedia-bearing card of claim 14 wherein the spring comprises a spiral spring.

16. The scent- and multimedia-bearing card of claim 12 wherein the scent release unit further comprises:

a hinge connecting the cover to the scent release unit, whereby the cover can rotate about the hinge while opening and closing; and

a leaf spring cooperating with the hinge to return the cover to a closed position when the electromagnet is not energized.

17. The scent- and multimedia-bearing card of claim 10 wherein the scent release unit further comprises an absorbent material positioned within the scent release chamber for momentarily retaining scent to be released from the scent- and multimedia-bearing card.

18. The scent- and multimedia-bearing card of claim 9 wherein the scent release unit further comprises:

electrostatic scent release apparatus for ionizing scent in the scent release unit.

19. The scent- and multimedia-bearing card of claim 18 wherein the electrostatic scent release apparatus further comprises:

corona discharge pin for creating corona discharge to ionize scent; and

wiring for connecting the corona discharge pin to an external voltage source.

20. The scent- and multimedia-bearing card of claim 19 wherein the electrostatic scent release apparatus further comprises:

a grid opposite from the corona discharge pin for attracting ionized scent molecules to assist in the scent release process.

21. The scent- and multimedia-bearing card of claim 12 wherein the scent release unit further comprises:

electrostatic scent release apparatus for ionizing scent in the scent release unit.

22. The scent- and multimedia-bearing card of claim 21 wherein the electrostatic scent release apparatus further comprises:

corona discharge pin for creating corona discharge to ionize scent; and

wiring for connecting the corona discharge pin to an external voltage source.

23. The scent- and multimedia-bearing card of claim 22 wherein the cover and electromagnet are coated in epoxy, wherein the epoxy protects the cover and electromagnet during corona discharge.

24. The scent- and multimedia-bearing card of claim 22 wherein the electrostatic scent release apparatus further comprises:

a grid opposite from the corona discharge pin for attracting ionized scent molecules to assist in the scent release process.

25. A scent-bearing card for use with encapsulated optical multimedia storage devices of the type wherein an optical disc is contained in a storage housing, the scent-bearing card and encapsulated optical multimedia storage devices for use with a separate scent release and multimedia playback system to create an immersive multimedia experience comprised of olfactory and visual or sound elements, the scent-bearing card comprising:

a scent storage medium for storing at least one scent; and

scent release control information for use by the scent release and multimedia playback system in controlling scent release from the scent-bearing card.

26. The scent- and multimedia-bearing card of claim 25 wherein the encapsulated multimedia storage optical multimedia storage device comprises a Type II DVD-RAM-like cassette device, the Type II DVD-RAM-like cassette device having a housing structure encapsulating a removable DVD-RAM or DVD disc.

27. The scent-bearing card of claim 25 wherein the scent storage medium stores a plurality of scents.

28. The scent-bearing card of claim 25 wherein the scent storage medium stores at least one fragrance.

29. The scent-bearing card of claim 25 wherein the scent storage medium stores at least one aroma.

30. The scent-bearing card of claim 25 wherein the scent storage medium stores at least one flavor.

31. The scent-bearing card of claim 25 wherein the scent storage medium stores at least one air-borne therapeutic agent.

32. The scent-bearing card of claim 25 wherein the scent storage medium stores at least one air-borne medicine.

33. The scent-bearing card of claim 33 wherein the scent storage medium comprises:

a housing;

a scent storage reservoir contained in the housing; and

a scent release unit connected to the scent storage reservoir for releasing scent from the scent-bearing card.

34. The scent-bearing card of claim 33 wherein the scent release unit comprises:

a scent release chamber for containing scent just prior to release; and

a tube connecting the scent reservoir to the scent release chamber.

35. The scent-bearing card of claim 34 wherein the scent release chamber comprises a three dimensional region enclosed on all sides except having a scent release opening facing upwards for releasing scent from the scent release chamber, and wherein the scent release unit further comprises:

a cover for covering the scent release opening, wherein the cover is moveable between at least two positions, a first position wherein the scent release opening is substantially sealed thereby preventing scent from escaping from the scent release

chamber, and a second position, wherein the cover is displaced from the opening in the scent release chamber, wherein the displacement of the cover permits scent to escape from the scent release chamber during scent release operations.

36. The scent-bearing card of claim 35 wherein the cover is made from electromagnetic material and wherein the scent release unit further comprises:

an electromagnet for moving the cover from the first position to the second position; and

electromagnet control means for controlling the operation of the electromagnet.

37. The scent-bearing card of claim 36 wherein the electromagnet control means further comprises:

wiring for receiving control signals from the scent release and multimedia playback system, the control signals controlling the operation of the electromagnet.

38. The scent-bearing card of claim 36 further comprising:

a spring connecting the cover to the scent release unit, wherein the spring maintains the cover in the first, closed position until the electromagnet is energized, when the cover moves to the open, second position, and wherein the spring returns the cover to the closed position after the electromagnet is de-energized.

39. The scent-bearing card of claim 38 wherein the spring comprises a spiral spring.

40. The scent-bearing card of claim 36 wherein the scent release unit further comprises:

a hinge connecting the cover to the scent release unit, whereby the cover can rotate about the hinge while opening and closing; and

a leaf spring cooperating with the hinge to return the cover to a closed position when the electromagnet is not energized.

41. The scent-bearing card of claim 33 wherein the scent release unit further comprises an absorbent material positioned within the scent release chamber for momentarily retaining scent to be released from the scent-bearing card.

42. The scent-bearing card of claim 33 wherein the scent release unit further comprises:

electrostatic scent release apparatus for ionizing scent in the scent release unit.

43. The scent-bearing card of claim 42 wherein the electrostatic scent release apparatus further comprises:

corona discharge pin for creating corona discharge to ionize scent; and

wiring for connecting the corona discharge pin to an external voltage source.

44. The scent-bearing card of claim 43 wherein the electrostatic scent release apparatus further comprises:

a grid opposite from the corona discharge pin for attracting ionized scent molecules to assist in the scent release process.

45. The scent-bearing card of claim 36 wherein the scent release unit further comprises:

electrostatic scent release apparatus for ionizing scent in the scent release unit.

46. The scent-bearing card of claim 45 wherein the electrostatic scent release apparatus further comprises:

corona discharge pin for creating corona discharge to ionize scent; and

wiring for connecting the corona discharge pin to an external voltage source.

47. The scent-bearing card of claim 46 wherein the cover and electromagnet are coated in epoxy, wherein the epoxy protects the cover and electromagnet during corona discharge.

48. The scent-bearing card of claim 47 wherein the electrostatic scent release apparatus further comprises:

a grid opposite from the corona discharge pin for attracting ionized scent molecules to assist in the scent release process.

49. A method for releasing scent from a scent-bearing card, the scent-bearing card storing scent in a scent storage unit, the scent being released from the scent-bearing card by a scent release unit connected to the scent storage unit, the scent release unit having an opening for releasing scent, the scent release unit further comprising a cover for covering the opening in the scent release unit when scent is not being released from the scent-bearing card, the scent release unit further comprising an electrostatic scent release apparatus for assisting in scent release, wherein the electrostatic scent release apparatus comprises at least a corona discharge apparatus, the method comprising the following steps:

moving scent from the scent storage unit to the scent release unit;

opening the cover in the scent release unit to permit scent release to a region immediately adjacent to the scent release unit;

energizing the electrostatic scent release apparatus, thereby ionizing the scent molecules in the scent release unit;

allowing ionized scent to escape from the opening in the scent release unit to a region outside the scent-bearing card;

creating an air flow near the scent-bearing card to assist in the venting of the released scent to a user, thereby entraining the released scent molecules in the air flow; and

venting the scent molecules entrained in the air flow to the user.

50. The method of claim 49 wherein the electrostatic scent release unit further comprises an electrically charged grid for attracting scent ionized by the corona discharge apparatus, the method comprising the following further step:

charging the grid to attract ionized scent molecules, thereby assisting the scent release operation.

51. The method of claim 49 comprising the following further step:

releasing a scent-neutralizing substance to neutralize the previously-released scent.

52. The method of claim 51 wherein the scent-neutralizing substance comprises ozone.

53. The method of claim 51 comprising the following further step:

releasing another scent after the previously-released scent has been neutralized by the scent-neutralizing substance.

54. The method of claim 52 comprising the following further step:

releasing another scent after the previously-released scent has been neutralized by the ozone.

55. A method for using a scent- and multimedia-bearing disk having electrostatic scent release, wherein the method uses an associated scent recovery/release and multimedia playback system to release scent and recover multimedia information from

the scent- and multimedia-bearing disk, and wherein the method comprises the following steps:

receiving an input command from a user to initiate scent release and multimedia playback;

recovering digital scent release and multimedia playback control information corresponding to the user input command from the scent- and multimedia-bearing portion of the disk;

initiating multimedia recovery and playback corresponding to the multimedia segment selected by the user;

interpreting the identity, time, and duration of scent release reflected in the digital scent release and multimedia playback control information; and

releasing the proper scents at the proper time and for the proper duration from the scent- and multimedia-bearing disk using electrostatic scent release.

56. The method of claim 55 wherein a plurality of scents are released simultaneously.

57. The method of claim 55 comprising the additional following step:

releasing a scent neutralizing agent following the release of a scent.

58. An electrostatic scent storage and release unit for use in scent-bearing and scent- and multimedia-bearing disks and cards, wherein the electrostatic scent release unit comprises:

a scent storage reservoir;

a scent release plenum;

a capillary tube connecting the scent storage reservoir to the scent release plenum, wherein during scent release operations scent flows from the scent storage reservoir to the scent release plenum; and

an electrostatic discharge apparatus for ionizing scent to be released.

59. The electrostatic scent scent storage and release unit of claim 58 further comprising:

a piezoelectric vibrator that vibrates the capillary tube during scent release operations to improve the flow of scent from the scent storage reservoir to the scent release plenum.

60. A method for releasing scent from an electrostatic scent storage and release unit, wherein the electrostatic scent release unit comprises a scent storage reservoir; a scent release plenum; a capillary tube connecting the scent release plenum to the scent storage reservoir; an electrostatic discharge apparatus located in the scent release plenum; and a piezoelectric vibrator, the method comprising the following steps:

opening the scent storage reservoir to permit scent to flow from the scent storage reservoir to the scent release plenum;

vibrating the piezoelectric vibrator to improve scent flow from the scent storage reservoir to the scent release plenum;

ionizing the scent in the scent release plenum using the electrostatic discharge apparatus; and

releasing scent from the scent release plenum.

61. A scent- and multimedia-bearing disk that is capable of simultaneous scent release and multimedia information recovery, wherein the scent- and multimedia-bearing disk further comprises:

a circular disk substrate having a first side and a second side, wherein the first side comprises an optical multimedia storage side and the second side comprises a scent storage side, and wherein the scent storage side further comprises:

at least one scent storage housing comprising an enclosed three-dimensional region for storing at least one scent, the scent storage housing positioned atop the disk substrate, and wherein the scent storage side of the circular disk substrate has at least two sectors, an outermost ring-like circular sector and an innermost circular sector, the scent storage housing being positioned in the outermost ring-like circular sector;

at least one electrostatic scent release unit positioned within the scent storage housing, the electrostatic scent release unit comprising an electrostatic discharge needle for ionizing scent stored within the scent storage housing;

scent release means for releasing ionized scent;

electrostatic potential supply wiring positioned within the innermost sector of the scent storage side, the wiring arrayed in a circular pattern about the center of the circular disk, and having a wiring segment extending along a radius of the circular disk, the radial wiring segment connecting the inner wiring circle to the electrostatic scent release unit; and

a static top supply unit positioned atop the innermost sector of the circular disk, the static supply module further comprising:

a cylindrical, hollow housing mounted atop the innermost sector of the

circular disk;

an electrical connector positioned atop the circular top surface of the cylindrical housing for accepting electric potential;

a spring-and-metallic-ball assembly mounted within the hollow portion of the cylindrical housing, wherein the spring-and-metallic-ball assembly is connected to the electrical connector on top and contacts the inner wiring circle positioned on the surface of the inner sector of the circular disk on the bottom,

whereby the spring-and-metallic-ball assembly maintains a constant electrical contact between the electrical connector and electrostatic scent release unit as the scent- and multimedia-bearing disk rotates and top supply module remains static, thereby permitting simultaneous scent release and multimedia playback operations.

62. The scent- and multimedia-bearing disk of claim 61 wherein the scent release means comprises a semi-permeable membrane which permits ionized scent to escape.

63. The scent- and multimedia-bearing disk of claim 61 wherein the scent release means comprises a single release valve.

64. The scent- and multimedia-bearing disk of claim 61 wherein there are multiple scent storage units, electrostatic scent release units and spring-and-metallic-ball assemblies, thereby permitting the simultaneous release of multiple scents.

65. A scent- and multimedia-bearing disk that is capable of simultaneous scent release and multimedia information recovery, the scent- and multimedia-bearing disk further comprising:

optical multimedia storage means for storing multimedia information;

scent storage means for storing scent, fragrance, aroma and flavor;

electrostatic scent release means for releasing scent stored in the scent storage means; and

electric potential supply means for supplying electric potential to the electrostatic scent release means while the scent- and multimedia-bearing disk rotates, thereby permitting simultaneous multimedia recovery and scent release operations.

66. A scent- and multimedia-bearing disk comprising:

a circular disk substrate, the circular disk substrate having an outermost circular, ring-like sector, and an innermost circular sector;

an optical storage medium positioned on the innermost circular sector of the circular disk substrate, the optical storage medium for storing multimedia information; and

a scent storage region positioned in the outermost circular ring-like sector, the scent storage region comprising microencapsulated scent, wherein the microencapsulated scent is released by laser energy.

67. The scent- and multimedia-bearing disk of claim 66, wherein there are a plurality of individual ring-like scent storage regions positioned in the outermost circular ring-like sector, each for storing a separate scent.

68. A scent-bearing disk comprising:

a circular disk substrate; and

a scent storage region positioned on the circular disk substrate, the scent storage region comprising microencapsulated scent, wherein the microencapsulated scent is released by laser energy.

69. The scent-bearing disk of claim 68, wherein there are a plurality of individual ring-like scent storage regions positioned in the scent storage region, each for storing a separate scent.

70. A scent release monitoring system for use in scent release systems and scent release and multimedia playback systems, the scent release monitoring system comprising:

a scent release detection means for detecting the occurrence of a scent release event;

a scent release rate determination means for determining the rate of scent release during a scent release event;

a scent release event duration monitoring means for monitoring the duration of a scent release event; and

a scent release event information storage means for storing scent release rate and scent release duration information generated by the scent release rate determination means and scent release event duration monitoring means.

71. The scent release monitoring system of claim 70 further comprising:

a scent remaining calculation means for calculating the amount of scent remaining in a scent release system based on the beginning scent amount, scent release rate, and scent duration information stored in the scent release event information storage means.

72. The scent release monitoring system of claim 70 further comprising:

a scent release event date recording means for recording the date and time of scent release events in the scent release event information storage means.

73. The scent release monitoring system of claim 70 further comprising:

a scent depletion prediction means for predicting when the scent remaining in a scent release system will be depleted, wherein the prediction is based on the beginning scent amount, scent release rate, scent release duration, and scent date/time information stored in the scent release event information storage means.

74. A method for monitoring scent release from scent release systems and scent release and multimedia playback systems comprising the following steps:

detecting a scent release event;

determining the scent release rate during the scent release event;

determining the duration of the scent release event; and

recording the scent release event information comprising the scent release rate and scent release duration in an electronic memory for use in monitoring scent utilization.

75. The method of claim 74 comprising the additional steps of:

recording scent release event information for subsequent scent release events;

multiplying the scent release rate by the scent release duration for each scent release event to determine the scent released;

adding the scent amount released during each scent release event to determine the total amount of scent released; and

subtracting the total amount of scent released from the beginning scent amount to determine the total amount of scent remaining.

76. The method of claim 74 comprising the additional steps of:

recording the time of each scent release event;

recording scent release event information, including the time of scent release, for each subsequent scent release event;

multiplying the scent release rate by the scent release duration for each scent release event to determine the amount of scent released;

adding the scent amount released during each scent release event to determine the total amount of scent released;

calculating the time span from the first scent release event to the last scent release event;

dividing the total amount of scent released by the time duration to determine a scent utilization rate;

subtracting the total amount of scent released from the beginning scent amount to determine the total amount of scent remaining; and

dividing the total amount of scent remaining by the scent utilization rate to calculate the estimated time left before the remaining scent is exhausted.

77. An editing apparatus for creating digital scent release and multimedia playback control information for use by a scent recovery/release and multimedia playback system to control scent recovery and multimedia playback operations, the editing apparatus comprising:

multimedia segment selection means for permitting a user to select a multimedia segment for use with scent release events;

timeline creation means for creating an electronic timeline corresponding to the duration of the multimedia segment; and

scent release event addition means for permitting a user to add a scent release event to the electronic timeline, whereby the addition of scent release event information

to the electronic timeline creates the digital scent release and multimedia playback control information;

a memory medium for use in storing the digital scent release and multimedia playback control information created by the user; and

recording means for transferring the digital scent release and multimedia playback control information to the memory medium where it can be retrieved at a future time for use in controlling scent release and multimedia playback operations.

78. The editing apparatus of claim 77 wherein the scent release event addition means permits the user to add multiple scent release events.

79. The editing apparatus of claim 77 wherein the scent release event addition means permits the user to specify the identity of the scent to be released.

80. The editing apparatus of claim 77 wherein the scent release event addition means permits the user to specify the duration of scent release.

81. The editing apparatus of claim 77 wherein the scent release event addition means permits the user to specify the start time for scent release.

82. The editing apparatus of claim 77 wherein the scent release event addition means permits the user to specify the end time for ending a scent release event.

83. The editing apparatus of claim 77 wherein the scent release event addition means permits the user to specify the rate of scent release during the scent release event.

84. A method for creating digital scent release and multimedia playback control information for use by a scent recovery/release and multimedia playback system in controlling simultaneous scent release and multimedia playback operations, the method

using an electronic editing system for creating the digital scent release and multimedia playback control information, the method comprising the following steps:

selecting a multimedia segment that will be played back in conjunction with scent release events;

creating an electronic timeline corresponding to the multimedia playback sequence;

adding at least one scent release event to the timeline, thereby creating the digital scent release and multimedia playback control information; and

saving the digital scent release and multimedia playback control information in a memory medium for future retrieval in controlling a scent release and multimedia playback sequence.

85. The method of claim 84 wherein during the adding a scent release event step the user specifies the identity of the fragrance, scent, aroma or flavor to be released.

86. The method of claim 84 wherein during the adding a scent release event step the user specifies the start time of the scent release event.

87. The method of claim 84 wherein during the adding a scent release event step the user specifies the end time for the scent release event.

88. The method of claim 84 wherein during the adding a scent release event step the user specifies the scent release rate to be applied during the scent release event.

89. The method of claim 84 comprising the additional step of:

adding multiple scent release events to the electronic timeline.

90. A multimedia playback goggle and electrostatic scent release mask for releasing scent directly to the nose and/or mouth of a user, the multimedia playback goggle and electrostatic scent release mask further comprising:

a nose-bridge-mounted display screen placed directly in front of the eyes of the user to display multimedia information;

ear phones to play back auditory information;

an electrostatic scent release mask, the electrostatic scent release mask further comprising:

a mask housing that comfortably fits over the nose and mouth of a user;

at least one scent storage unit; and

at least one electrostatic scent release unit.

91. The multimedia playback goggle and electrostatic scent release mask of claim 90, wherein the at least one scent storage unit and at least one electrostatic scent release unit are positioned adjacent to the nose to release scent directly to the nose of the user.

92. The multimedia playback goggle and electrostatic scent release mask of claim 91, wherein the electrostatic scent release means further comprises:

an electrostatic discharge needle for ionizing scent to be released from the at least one scent storage means;

a source of electric potential to supply electricity to the electrostatic discharge needle; and

wiring connecting the electrostatic discharge needle and the source of electric potential.

93. The multimedia playback goggle and electrostatic scent release mask of claim 92, wherein the electrostatic scent release means further comprises:

an electrostatic grid to attract scent molecules ionized by the electrostatic discharge needle.

94. The multimedia playback goggle and electrostatic scent release mask of claim 92, wherein the electrostatic scent release means further comprises:

a fan and ducting to create an air flow in the vicinity of the electrostatic discharge needle to assist in entraining scent ionized by the electrostatic discharge needle.

95. The multimedia playback goggle and electrostatic scent release mask of claim 90, wherein the at least one scent storage unit and at least one electrostatic scent release unit are positioned adjacent to the mouth to release flavor directly to the mouth of the user.

96. The multimedia playback goggle and electrostatic scent release mask of claim 95, wherein the electrostatic scent release means further comprises:

an electrostatic discharge needle for ionizing scent to be released from the at least one scent storage means;

a source of electric potential to supply electricity to the electrostatic discharge needle; and

wiring connecting the electrostatic discharge needle and the source of electric potential.

97. The multimedia playback goggle and electrostatic scent release mask of claim 96, wherein the electrostatic scent release means further comprises:

an electrostatic grid to attract scent molecules ionized by the electrostatic discharge needle.

98. The multimedia playback goggle and electrostatic scent release mask of claim 97, wherein the electrostatic scent release means further comprises:

a fan and ducting to create an air flow in the vicinity of the electrostatic discharge needle to assist in entraining scent ionized by the electrostatic discharge needle.